

U.S.- China Water Resources Workshop

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# “STATE OF THE LAND”

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## THE STATE OF THE LAND

In the United States we have come to expect an abundant supply of fresh vegetables, fruit and meat in every grocery store; clean water in the faucet of every home; lakes, rivers and beaches where we can swim or fish; and areas we can enjoy wildlife and scenic beauty. Most of our people do not recognize the relationship between our expectations and the management of our private lands. This morning I'm going to give you an overview on the "state of our private lands" in the United States and a quick primer on what we are doing to maintain this balance, including a short discussion on the major environmental regulations in place in the United States.

For more than 50 years the U.S. Department of Agriculture has "read" the land through conservation needs assessments and natural resources inventories. One of the principle data gathering efforts today is the Natural Resource Conservation Service's (NRCS) National Resources Inventory (NRI), the Nations most comprehensive program for gathering data and presenting information on nonfederal land in the United States. The NRI is a multi-resource inventory based on soils and other natural resource data collected at sample sites -800,000 sites in 1992 and 1997. It provides a record of the nation's conservation accomplishments and needs. It currently includes data from 1982, 1987, 1992, and soon to be released 1997 data. The majority of the information that I'm sharing with you this morning comes from this inventory. I encourage you to visit our web site <http://www.nhq.nrcs.usda.gov/land/index/GoH.html> for additional information.

### America's Private Land

We in the United States are endowed with an enormous and complex landscape. Its highly variable geography and climate lends themselves to a great array of soils, water and vegetative conditions. Most privately owned land is in an agriculture use - crops, grazing, or forestry. Although urban land has nearly tripled since 1945, it remains less than 3 percent. About 20% are used for crops (382 million acres.) Grazing land, which includes both rangeland and pasture (525 million acres), accounts for approximately 25% of our Nation's private lands. Rangeland is found in nearly every state, but is found primarily in the west with pasture most often found in the east. Privately owned forest lands comprise another 20% (395 million acres.) The majority of this land is found in the east where marginal crop and pastureland has gradually reverted to forest.

### Land Productivity and Diversity

The U.S. agriculture and food system is an integral component of our national economy, contributing nearly 16% to the Nation's gross domestic product in 1992 and accounting for at least 18% of the Nation's civilian jobs. It varies widely in size, scale, resource use,

product mix, and interaction with nonfarm sector. Most grain crops are found in the nation's breadbasket, most timber in the northwest and southeast, rangeland primarily in the west. Specialty crops such as fruit, vegetables and horticulture crops, are commonly found near metropolitan areas, where almost two-thirds of U.S. agriculture production - value wise - occurs. Based on sales per acre, urban fringe agriculture is two and one half times as productive as rural agriculture.

### Private Land and Water Supply

The U.S. is a water rich Nation, but water availability could be the most significant national water issue in the 21st century. Certain areas of the country, such as the Southwest, have insufficient precipitation to meet demand in an average year. These areas use more than 100% of their average annual precipitation and either import water from other watersheds or mine groundwater to meet annual demand. Water use conflicts have existed in those areas for decades, but the conflicts have intensified as demands have increased. Where water demand exceeds 75% of available precipitation, water use conflicts are just beginning to emerge and are likely to escalate with increased demand. Much of the East and parts of the Pacific Northwest have abundant freshwater supplies, but even these areas have experienced water use conflicts and more may arise. Water quality and quantity are closely related. Actions that reduce water can adversely affect water quality, just as poor water quality can reduce the amount of water able to support desired beneficial uses.

Much of land use change and increased competition for water is driven by population growth. Even at the low rate of natural increase in the US, total population is projected to approach 335 million by 2025. Much of the increase in recent years has occurred in areas that already depend upon more than 100% of their average annual precipitation.

Ground water withdrawal at rates that exceed replenishment - ground water mining - leads to water table declines, land subsidence, and saltwater intrusion into freshwater supplies. The Central Valley of California is the most heavily pumped area in the US. Because of the structure of the aquifer, land subsidence has characterized groundwater development in a large part of the valley.

The High Plains aquifer underlies parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas and Wyoming. Approximately 30% of the groundwater used for irrigation in the US is pumped from this aquifer. This intense use has led to significant declines in water levels, exceeding 100 feet in some areas.

### The Land Dynamic

Land shifts into and out of various uses. Between 1982 and 1992, the net amount of land devoted to crops, pasture and range declined by 39 million acres (of which 36.4 million were enrolled into the Conservation Reserve Program), 6 million acres of pasture and 10 million acres of rangeland. Forestland showed a modest increase. The net acreage gained or lost to different uses only tells part of the story. Although 60 million acres

shifted from cropland to other uses, about 21 million acres shifted from other uses into cropland during this same period. Nearly 3 million acres of cropland were developed for residential purposes. As agriculture land is converted, its contribution to local economies declines. Farmland preservation surrounding some urban areas is undertaken at least in part to preserve the feeling of openness that is so important to us. Scenic vistas with a minimum of manmade obstructions have been shown to reduce the stress of modern living.

Land use changes also may occur when one use is abandoned because it can no longer be supported economically. In 1992, about 62 million acres of agricultural land were irrigated, down only slightly from 1982. But a regional shift was evident. Irrigated land in the western states declined substantially, as the use of groundwater for irrigation became uneconomical. Conversely, irrigation expanded in the eastern US, in part reflecting producers' efforts to reduce risk from drought. Irrigation in relatively humid areas is supplemental, with precipitation meeting the crops

### Protecting and Enhancing Agriculture Productivity

The amount of cropland still requiring conservation treatment to maintain productivity declined by nearly a quarter between 1982 and 1992, in part because of land retirement, but also because of producer's adoption of soil conserving crop management practices, such as conservation tillage. Pasture and forest acres needing conservation treatment also declined between 1982 and 1992. Conservation treatment, primarily forage improvement, was needed on approximately 46% of pastureland in 1992. Private, non-industrial forest concerns include structural and biological diversity, fuel-loading and fire management, insects and disease, pollution and riparian area damage.

The bulk of private rangeland evaluated in 1992 (59%) exhibited some form of disturbance that affected its productive capacity. Accelerated soil erosion threatens sustained production on at least a fifth of all rangeland acres. Invasive weeds and unwanted brush are the other major management problems on rangeland, adversely affecting at least 69 million acres - about 17% of all rangeland. Invasive perennial weed species are distributed across the West, posing a significant hazard to rangeland health.

Irrigation in arid and semiarid regions often concentrates salts in soil and water, sometimes-creating severe production and environmental problems. About 570 million acres (30%) of the contiguous US have a moderate to severe potential for soils and water salinity problems. Saline soils contain sufficient soluble salts to adversely affect plant growth. At least 48 million acres of cropland and pastureland are currently affected. Reclaiming saline soils economically is difficult, if not impossible. Salinized soil is lost to agriculture production, at least in the near term. In 1971, approximately 81,000 acres of saline-affected cropland had been taken out of production in Montana. By 1987, that number had risen to 300,000 acres. Recent surveys indicate that affected acres are growing at a rate of 10% per year.

Conservation gains are seldom permanent. Changes in technology and application are

challenged to keep pace with natural resource conditions, land use, market forces, and production technology and trends. Between 1982 and 1992 were significant in terms of conservation gains. During this period, new agricultural conservation policies were put in place that reduced conversion of wetlands to croplands, required compliance with soil conservation provisions as a feature of participation in commodity or other Federal farm programs, and encouraged long term retirement of cropland particularly susceptible to degradation: important conservation cost-share programs also remained in place. The challenge is to expand on those accomplishments and make sure they endure.

### Soil and Productivity

Soil erosion occurs naturally on all lands, but is aggravated by the action of man. Approximately 40% of the total soil erosion in the US result from such activities as construction, logging, and off-road vehicle use, or as the result of natural events such as flooding, fire or drought. While erosion can reduce soil productivity, it also has a substantial affect on the quality of our water and atmospheric resources. A certain level of erosion is tolerable, meaning that it does not harm soil productivity. This level, referred to as "T," varies by soil type and considers a number of factors, including the time required for new soil to form. Soil erosion at rates greater than T is a special concern because it threatens agricultural sustainability. Sheet and rill erosion tends to be a greater problem in the humid East, while wind erosion is a greater problem in the arid and semiarid West. Estimates of streambank, gully, irrigation-induced and ephemeral gully erosion currently are not included in standard soil erosion assessments. Such forms of erosion can be substantial in certain situations.

American farmers have made great strides in reducing cropland erosion using soil-conserving practices, such as crop residue management, contour tillage, and stripcropping and land retirement. Highly erodible land was the target of the first five CRP sign-ups. Later sign-ups also targeted wildlife habitat. The CRP hit its target. Erosion rates declined from 12.5 tons per acre to 1.5 tons per acre. Wildlife populations have rebounded in many areas, as grassland and forest habitat was increased as well as increased establishment of wildlife plantings, ponds, and wetlands. Associated gains included recreational opportunities, scenic amenities, and water quality. Given the relationship between soil quality and the quality of other natural resources, soil conservation is central to maintaining healthy ecosystems.

### Agriculture Affects Water Quality

An assessment completed by the Environmental Protection Agency on the status of the Nations' water resources indicates that of the river miles assessed, about 64% were found to be good quality. Thirty-six percent of the assessed miles suffered from use impairments caused by one or more sources. Agriculture was found to contribute to impairments in 60% of these streams.

One of the major sources of impairments from agriculture is sediment, often with nutrients or chemicals adsorbed to the soil particles, that enters streams and rivers as a

result of soil erosion. While eroded soil may not move directly into waterways, and prevention of field erosion does not stop soil movement within water channels, there is a direct water quality benefit when farmers and ranchers reduce the amount of soil that moves off the land.

Concentrated animal production sites are of particular environmental concern because of the potential for nutrient and bacterial contamination of water resources as well as odor problems affecting neighborhood communities. Industrialization of the livestock production sector, spurred by economies of size and new production and processing technologies, has produced livestock concentrations and geographic shifts unprecedented in the US. Parts of the US are primary hotspots for animal manure problems, in part because of soil and climate factors and in part because those areas lack adequate cropland on which to apply the manure properly. Nutrients, mainly nitrogen, phosphorus, and potassium, are applied to promote plant growth. If they are applied inappropriately or in excessive amounts, those beneficial materials can threaten associated water resources.

Since 1979, the agriculture sector has accounted for about 80% of all pesticide use each year. Pesticides may contaminate water by leaching through soil profile or by running off the field surface into nearby water bodies. Many of the same factors affect leaching and runoff potential, and some areas have high potential for both pathways. Developments such as integrated pest management, biotechnology, improved pesticide and nutrient management planning and livestock management systems all work to reduce the potential for agriculture to impair the Nation's water resources. Agriculture also contributes to water quality improvement through such conservation measures as buffer strips, grassed waterways, and wetland and riparian restorations.

### Improving the State of the Land

There is much good news about the state of America's private lands. America's landowners seem to be maintaining and, in some instances improving the health of the land on millions of acres. There remains, however, where the state of the land is in decline and national concern is warranted. To meet the challenge adequately, we must move beyond science and data and trends and reach out effectively to the millions of people who are intimately affected by the health of the land. Only in the success of our abilities to work together, coupled with our skill in assessing the land, will we realize our public as well as individual conservation objectives.